中认信通
CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)

ACCREDITED
TESTING LABORATORY
CERTIFICATE # 6356.01

TEST REPORT

Applicant: **Flybotix SA**

Address: Rue de Lausanne 64, 1020 Renens (Switzerland)

FCC ID: **2BDOL-WAVEINTHEAIR**

Product Name: **Radar Module**

Standard(s): **47 CFR Part 15, Subpart C (15.255)**
ANSI C63.10-2020+Cor.1-2023
KDB 364244 D01 Meas 15.255 Radars v01

The above device has been tested and found compliant with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

Report Number: **CR231171703-00**

Date Of Issue: **2025/4/11**

Reviewed By: **Calvin Chen** Calvin Chen

Title: RF Engineer

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Title: Manager

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Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

Declarations

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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Each test item follows the test standard(s) without deviation.

CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	CR231171703-00	Original Report	2025/4/11

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	Radar Module
EUT Model:	APA0026
Operation Frequency Range:	60-64 GHz
Modulation Type:	FMCW
Rated Input Voltage:	5Vdc
Serial Number:	2EK8-1(Assigned by CCICT)
EUT Received Date:	2023/12/12
EUT Received Status:	Good

Antenna Information Detail▲:

Antenna Type	input impedance (Ohm)	Antenna Gain	Frequency Range
Microstrip Patch	50	0 dBi	60-64GHz
The Method of §15.203 Compliance: ☒Antenna was permanently attached to the unit. ☐Antenna use a unique type of connector to attach to the EUT. ☐Unit was professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.			

Accessory Information:

Accessory Description	Manufacturer	Model
/	/	/

1.2 Description of Test Configuration

1.2.1 EUT Operation Condition:

EUT Operation Mode:	The system was configured for testing in Engineering Mode, which was provided by the manufacturer. The device has 3T4R, 3TX only simultaneously transmit. Per KDB 364244, for radar transmitters employing FMCW, the requisite RF parameters shall be measured with the active frequency sweep function
Equipment Modifications:	No
EUT Exercise Software:	No
Engineering Mode was provided by manufacturer▲. The maximum power was configured default setting.	

1.2.2 Support Equipment List and Details

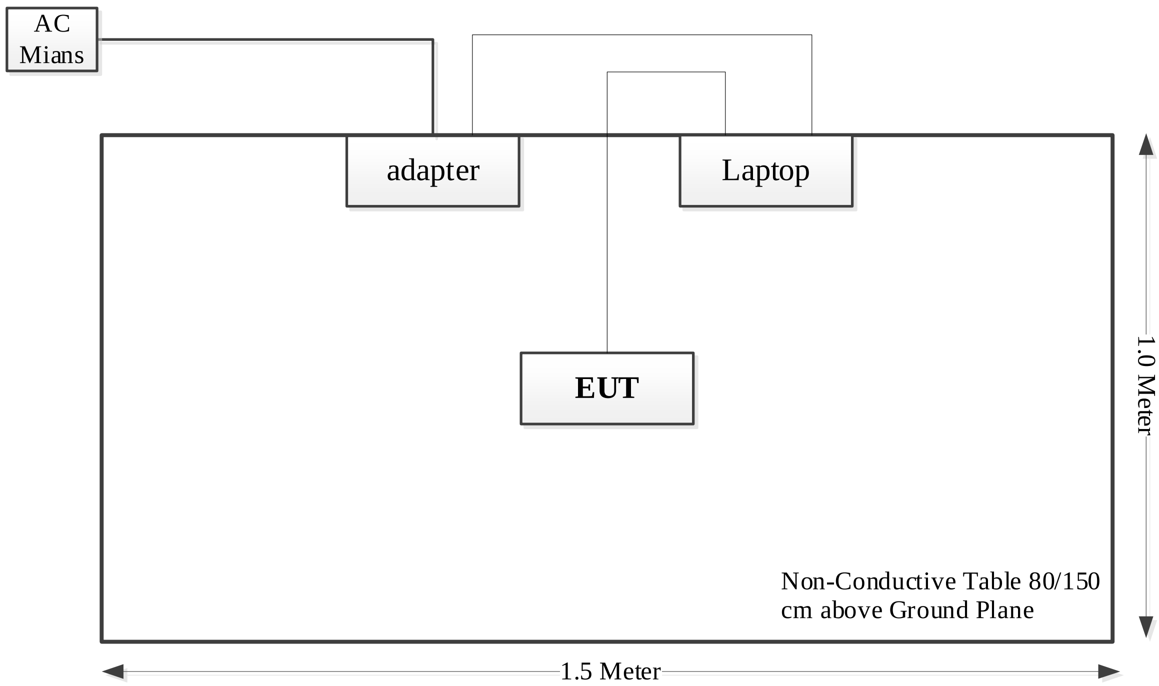
Manufacturer	Description	Model	Serial Number
Lenovo	Laptop	T460S	60PDTEK7
Lenovo	Adapter	A17-265N2A	00PC757

1.2.3 Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Power Cable	No	No	1.2	Adapter	Laptop
USB Cable	No	No	1	Laptop	EUT

1.2.4 Block Diagram of Test Setup

Spurious Emissions:



1.3 FAR Field Boundary Calculations

The far-field boundary is given in ANSI C63.10-2020:

$$R_m = 2D^2 / \lambda$$

Where:

D is the largest dimension of the antenna aperture in m and

λ is the free-space wavelength in m at the frequency of measurement.

The minimum test distance for the frequency range 40GHz-200GHz determine as below:

Model	Frequency Range (GHz)	Largest Dimension of the Horn Antenna (mm)	Minimum Test Distance R_m (m)
M19RH	40-60	46.3	0.86
861V/385	50-75	43.7	0.95
M12RH	60-90	30.02	0.54
M08RH	90-140	19.7	0.36
M05RH	140-220	12.5	0.23

Note: The test distances used were 1.0 m from 40 GHz to 90 GHz, and 0.5 m from 90 GHz to 200 GHz, it can be seen that the EUT was always in the Far-field of the Receive Antenna during all Radiated Emissions Tests.

1.4 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
Unwanted Emissions, radiated	30M~200MHz: 4.15 dB,200M~1GHz: 5.61 dB,1G~6GHz: 5.14 dB, 6G~18GHz: 5.93 dB,18G~26.5G:5.47 dB, 26.5G~40G:5.63 dB 40~60G: 4.83dB, 60G~90G: 4.94dB, 90G-140G: 5.46dB, 140G-220G: 6.00dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	2.8 dB (150 kHz to 30 MHz)

2. SUMMARY OF TEST RESULTS

Standard(s)/Rule(s)	Description of Test	Result
§15.207(a)	AC Line Conducted Emissions	Not Applicable (See Note 1)
§15.205, §15.209, §15.255(d)	Radiated Emissions	Compliant
§15.215	20dB Emission Bandwidth	Compliant
C63.10-2020 9.4	99% Occupied Bandwidth	Compliant
§15.255(b)(3)	Equivalent Isotropically Radiated Power (EIRP)	Compliant
§15.255 (f)	Frequency Stability	Compliant
§15.255(b)(3)	Duty Cycle	Compliant
§15.255 (a)(h)	Operation Restriction and Group Installation	Compliant (See Note 2)
§15.203	Antenna Requirement	Compliant
§15.255(g), §1.1310, §2.1091	Maximum Permissible Exposure (MPE)	Compliant

Note:
Note 1: The device was powered by battery when operating.
Note 2: The device was used for unmanned aircraft which is on the ground, the aircraft used exclusively to carry out inspections of confined spaces such as sewers, silos, pipelines, and others. The flight altitude is no more than 400 feets.

3. REQUIREMENTS AND TEST PROCEDURES

3.1 AC Line Conducted Emissions

3.1.1 Applicable Standard

FCC§15.207(a).

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

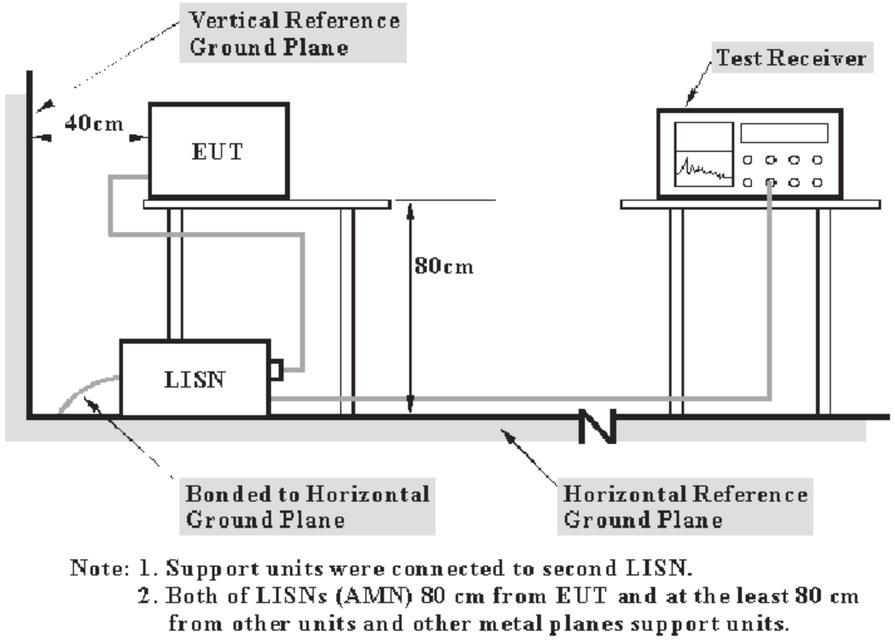
(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 μV within the frequency band 535-1705 kHz, as measured using a 50 μH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtainig their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

3.1.2 EUT Setup



The setup of EUT is according with per ANSI C63.10-2020 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

3.1.3 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

3.1.4 Test Procedure

During the conducted emission test, the EUT was connected to the outlet of the first LISN.

The frequency and amplitude of the six highest ac power-line conducted emissions relative to the limit, measured over all the current-carrying conductors of the EUT power cords, and the operating frequency or frequency to which the EUT is tuned (if appropriate), should be reported, unless such emissions are more than 20 dB below the limit. AC power-line conducted emissions measurements are to be separately carried out only on each of the phase (“hot”) line(s) and (if used) on the neutral line(s), but not on the ground [protective earth] line(s). If less than six emission frequencies are within 20 dB of the limit, then the noise level of the measuring instrument at representative frequencies should be reported. The specific conductor of the power-line cord for each of the reported emissions should be identified. Measure the six highest emissions with respect to the limit on each current-carrying conductor of each power cord associated with the EUT (but not the power cords of associated or peripheral equipment that are part of the test configuration). Then, report the six highest emissions with respect to the limit from among all the measurements identifying the frequency and specific current-carrying conductor identified with the emission. The six highest emissions should be reported for each of the current-carrying conductors, or the six highest emissions may be reported over all the current-carrying conductors.

3.1.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = attenuation caused by cable loss + voltage division factor of AMN

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

3.2 Radiated Emissions

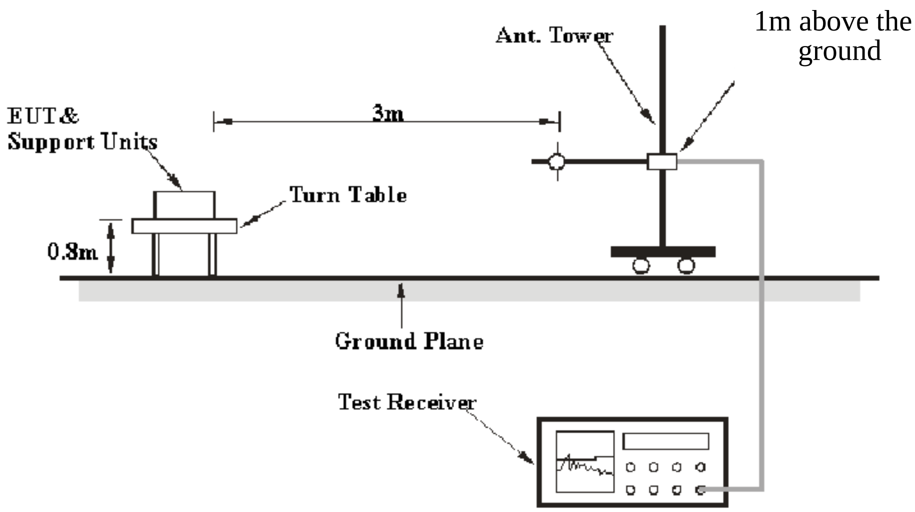
3.2.1 Applicable Standard

FCC §15.255

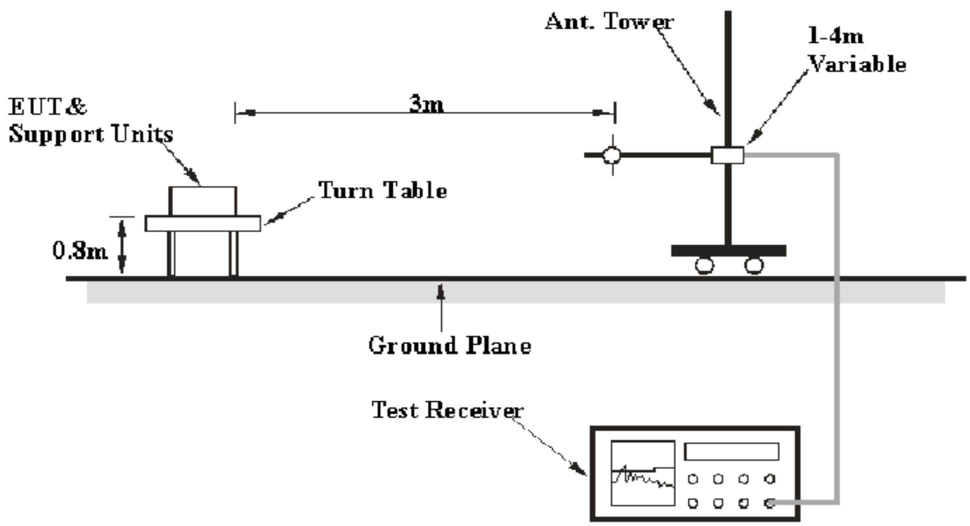
(d) Limits on spurious emissions:
(1) The power density of any emissions outside the 57-71 GHz band shall consist solely of spurious emissions.
(2) Radiated emissions below 40 GHz shall not exceed the general limits in § 15.209.
(3) Between 40 GHz and 200 GHz, the level of these emissions shall not exceed 90 pW/cm^2 at a distance of 3 meters.
(4) The levels of the spurious emissions shall not exceed the level of the fundamental emission.

3.2.2 EUT Setup

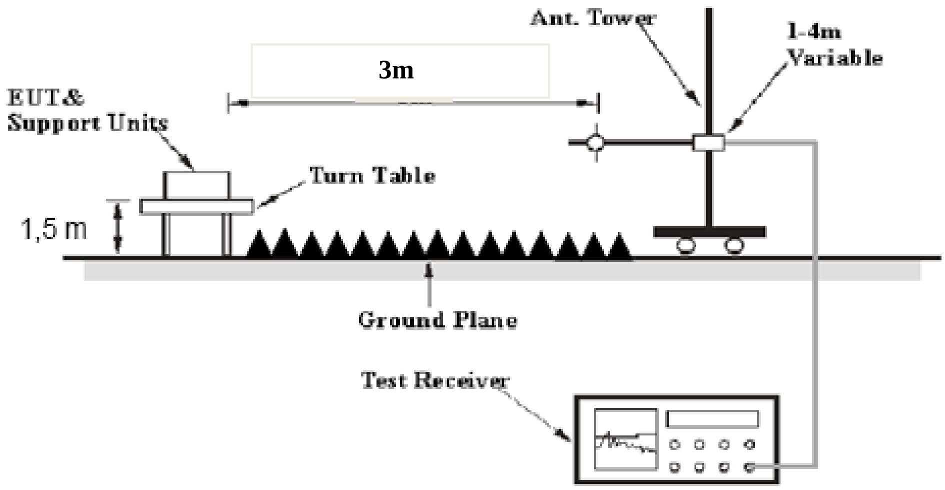
9kHz - 30MHz:



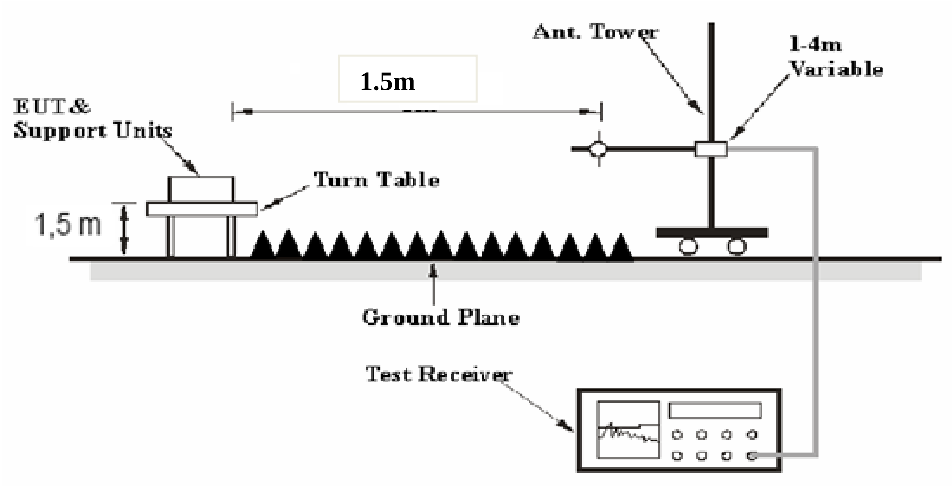
30MHz - 1GHz:



1-26.5 GHz:



26.5-40 GHz:



Above 40GHz:

The antenna is scanned around the entire perimeter surface of the EUT, in both horizontal and vertical polarizations, at the distance of 1.0 m from 40 GHz to 90 GHz, and 0.5 m from 90 GHz to 200 GHz.

The radiated emission and out of band emission tests were performed in the 3 meters chamber, using the setup accordance with the ANSI C63.10-2020 The specification used was the FCC 15.209/15.205 and FCC 15.255 limits.

For 9kHz-30MHz test, the lowest height of the magnetic antenna shall be 1 m above the ground and three antenna orientations (parallel, perpendicular, and ground-parallel) shall be measured.

3.2.3 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 200 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector	Measurement
9 kHz – 150 kHz	300 Hz	1 kHz	/	PK	PK
	/	/	200 Hz	QP/AV	QP/AV
150 kHz – 30 MHz	10 kHz	30 kHz	/	PK	PK
	/	/	9 kHz	QP/AV	QP/AV
30 MHz – 1000 MHz	100 kHz	300 kHz	/	PK	PK
	/	/	120 kHz	QP	QP

1GHz – 40GHz:
Pre-scan:

Measurement	RBW	Video B/W	Detector
PK	1MHz	3 MHz	Peak
AV	1MHz	5 kHz	Peak

Final measurement for emission identified during the pre-scan:

Measurement	RBW	Video B/W	Detector
PK	1MHz	3 MHz	Peak
AV	1MHz	10 Hz	Peak

Above 40GHz:

Measurement	RBW	Video B/W	Detector
AV	1MHz	3MHz	AV

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

The spurious emissions which below the limit more than 20dB was not be recorded.

3.2.4 Test Procedure

Refer to ANSI C63.10-2020 Clauses 9.7, 9.10, and 9.11.

A Maximizing procedure was performed to ensure that the highest emissions from the EUT were actually measured in all of the Test Arrangements of the EUT and Local Support Equipment.

In accordance with FCC Rules Part 15 Subpart A Section 15.35, Data was recorded in Quasi-peak detection mode for frequency range of 9 kHz-1 GHz except 9–90 kHz, 110–490 kHz, employing an average detector, and from 1 GHz to 40 GHz, all radiated emissions measurements were made using a Peak Detector and CISPR Average Detector. In accordance with FCC Rules Part 15 Subpart C Section 15.255, from 40 GHz to 200 GHz, all radiated emissions measurements were made using a Peak Detector.

According to C63.10, the 26.5-40GHz test result shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1.5m

Distance extrapolation factor =20 log (specific distance [3m]/test distance [1.5m]) dB= 6.02 dB

All emissions under the average limit and under the noise floor have not recorded in the report.

3.2.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Factor = Antenna Factor + Cable Loss- Amplifier Gain

Result = Reading + Factor

For 9kHz-26.5GHz:
Factor = Antenna Factor + Cable Loss- Amplifier Gain

For 26.5GHz-40GHz
Factor = Antenna Factor + Cable Loss- Amplifier Gain -Distance extrapolation Factor

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

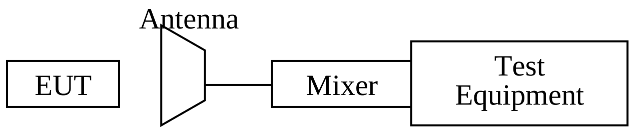
3.3 20dB Emission Bandwidth:

3.3.1 Applicable Standard

FCC §15.215

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

3.3.2 EUT Setup

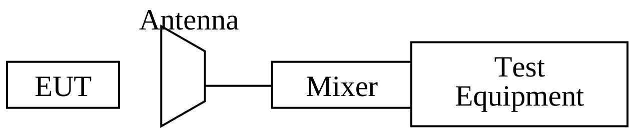


3.3.3 Test Procedure

According to ANSI C63.10-2020 Section 9.3.

3.4 99% Occupied Bandwidth

3.4.1 EUT Setup



3.4.2 Test Procedure

According to ANSI C63.10-2020 Section 9.4

3.5 Equivalent Isotropically Radiated Power (EIRP)

3.5.1 Applicable Standard

FCC §15.255(b)(3)

Field disturbance sensors/radar devices deployed on unmanned aircraft may operate within the frequency band 60 – 64 GHz, provided that the transmitter not exceed 20 dBm peak EIRP. The sum of continuous transmitter off-times of at least two milliseconds shall equal at least 16.5 milliseconds within any contiguous interval of 33 milliseconds. Operation shall be limited to a maximum of 121.92 meters (400 feet) above ground level.

3.5.2 Test Procedure

Refer to ANSI C63.20-2020 Clause 9.8

For radiated measurements:
1) Place the measurement antenna at a measurement distance that is in the far-field of the measurement antenna, in the far-field of the EUT antenna, and meets the measurement distance requirements for final radiated measurements as specified in 9.1.4.
2) Place the measurement antenna in the main beam of the EUT then maximize the fundamental emission using the procedures of 9.7, noting that multiple peaks can be found at different beam orientations and/or polarizations.
3) Correct the power reading from the spectrum analyzer for any external gain and/or attenuation between the measurement antenna and the spectrum analyzer. This is the power at the output of the measurement antenna
4) Calculate the EIRP from the power at the output of the measurement antenna using Equation (22), and then convert to linear form using Equation (24).

$$EIRP = 21.98 - 20\log(\lambda) + 20\log(d_{Meas}) + P - G \qquad (22)$$

where

$EIRP$	is the equivalent isotropic radiated power, in dBm
λ	is the wavelength of the emission under investigation [300/f(MHz)], in m
d_{Meas}	is the measurement distance, in m
P	is the power measured at the output of the measurement antenna, in dBm
G	is the gain of the measurement antenna, in dBi

NOTE—The measured power P includes all applicable instrument correction factors up to the connection to the measurement antenna.

5) Where applicable, calculate conducted output power from the EIRP using Equation (27).
For FMCW emissions, the procedures in 4.1.5.2.8 and Annex L shall be used.

3.6 Frequency Stability

3.6.1 Applicable Standard

FCC §15.255(f)

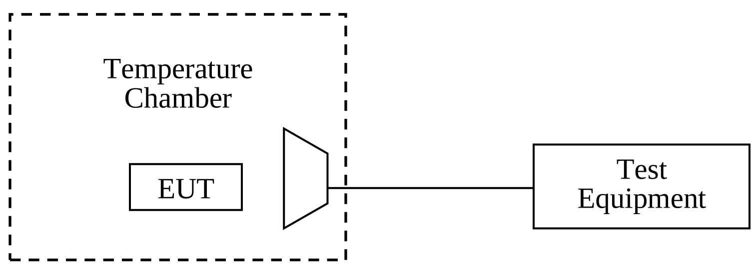
(f) Frequency stability. Fundamental emissions must be contained within the frequency bands specified in this section during all conditions of operation. Equipment is presumed to operate over the temperature range −20 to + 50 degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage, unless justification is presented to demonstrate otherwise.

3.6.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an power source. The EUT was placed inside the temperature chamber. Place the Horn antenna inside the temperature chamber. Place the EUT antenna toward the Horn antenna.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable DC power supply was connected to the equipment under test. The voltage was set from 85% to 115% of the nominal value. The output frequency was recorded for each voltage.



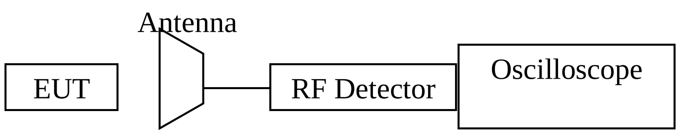
3.7 Duty Cycle:

3.7.1 Applicable Standard

FCC §15.255(b)(3)

Field disturbance sensors/radar devices deployed on unmanned aircraft may operate within the frequency band 60 – 64 GHz, provided that the transmitter not exceed 20 dBm peak EIRP. The sum of continuous transmitter off-times of at least two milliseconds shall equal at least 16.5 milliseconds within any contiguous interval of 33 milliseconds. Operation shall be limited to a maximum of 121.92 meters (400 feet) above ground level.

3.7.2 EUT Setup



3.7.3 Test Procedure

Use oscilloscope to permit accurate measurements of the ON and OFF times of the transmitted signal:

3.8 Operation Restriction and Group Installation

3.8.1 Applicable Standard

§15.255 (a) General. Operation under the provisions of this section is not permitted for equipment used on satellites.

§15.255 (b) Operation on aircraft. Operation on aircraft is permitted under the following conditions:

(1) When the aircraft is on the ground.

(2) While airborne, only in closed exclusive on-board communication networks within the aircraft, with the following exceptions:

(i) Equipment shall not be used in wireless avionics intra-communication (WAIC) applications where external structural sensors or external cameras are mounted on the outside of the aircraft structure.

(ii) Except as permitted in paragraph (b)(3) of this section, equipment shall not be used on aircraft where there is little attenuation of RF signals by the body/fuselage of the aircraft.

(iii) Field disturbance sensor/radar devices may only operate in the frequency band 59.3–71.0 GHz while installed in passengers' personal portable electronic equipment (e.g., smartphones, tablets) and shall comply with paragraph (b)(2)(i) of this section, and relevant requirements of paragraphs (c)(2) through (c)(4) of this section.

(3) Field disturbance sensors/radar devices deployed on unmanned aircraft may operate within the frequency band 60–64 GHz, provided that the transmitter not exceed 20 dBm peak EIRP. The sum of continuous transmitter off-times of at least two milliseconds shall equal at least 16.5 milliseconds within any contiguous interval of 33 milliseconds. Operation shall be limited to a maximum of 121.92 meters (400 feet) above ground level.

§15.255 (h) Any transmitter that has received the necessary FCC equipment authorization under the rules of this chapter may be mounted in a group installation for simultaneous operation with one or more other transmitter(s) that have received the necessary FCC equipment authorization, without any additional equipment authorization. However, no transmitter operating under the provisions of this section may be equipped with external phase-locking inputs that permit beam-forming arrays to be realized.

3.8.2 Result

15.255(a), the device is used for unmanned aircraft. Not used on satellites.

15.255(b)(1), the Radar Operation on aircraft when the aircraft is on the ground.

15.255(b)(2), not applicable, the device is used for unmanned aircraft.

15.255(b)(3), Operation be limited to a maximum of 121.92 meters (400 feet) above ground level. Please refer to the user manual.

§15.255 (h), No equipped with external phase-locking inputs that permit beam-forming arrays to be realized.

3.9 Antenna Requirement

3.9.1 Applicable Standard

FCC §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.
c. Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

3.9.2 Judgment

Please refer to the Antenna Information detail in Section 1.

4. TEST DATA AND RESULTS

4.1 AC Line Conducted Emissions

Not Applicable, the device was powered by battery when operating.

4.2 Radiation Emissions

4.2.1 9 kHz - 1 GHz

Serial Number:	2EK8-1	Test Date:	2024/1/3
Test Site:	966-2	Test Mode:	Transmitting
Tester:	Vic Du	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	24.9	Relative Humidity: (%)	45	ATM Pressure: (kPa)	101.4

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB6	A082520-5	2023/12/1	2026/11/30
BACL	Loop Antenna	1313-1P	3092721	2023/10/20	2026/10/19
R&S	EMI Test Receiver	ESR3	102724	2023/3/31	2024/3/30
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0470-02	2023/7/16	2024/7/15
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0780-01	2023/7/16	2024/7/15
Sonoma	Amplifier	310N	186165	2023/7/16	2024/7/15
Audix	Test Software	E3	201021 (V9)	N/A	N/A

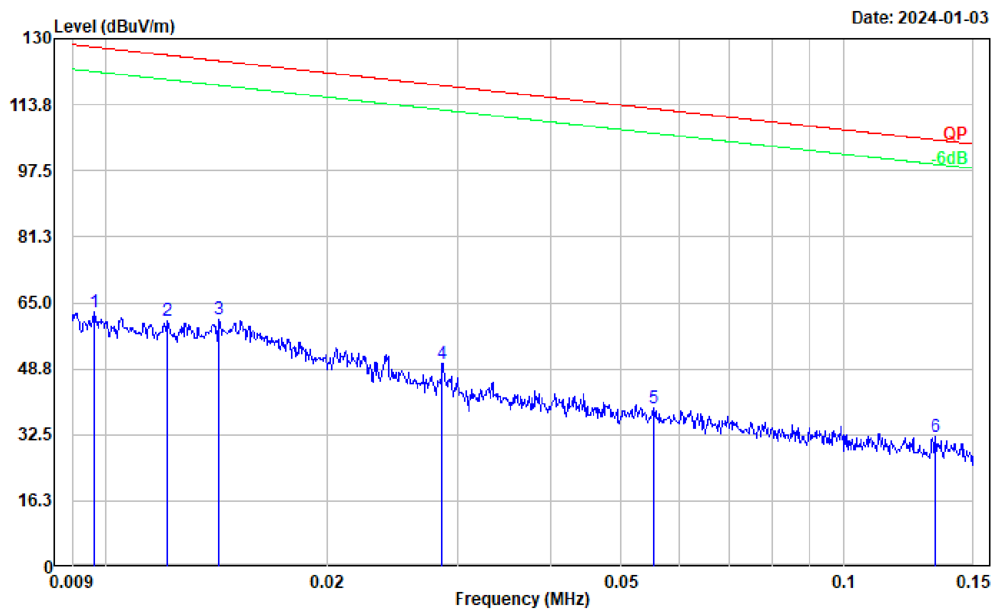
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

After pre-scan in the X, Y and Z axes of orientation, the worst case is refer to plots.

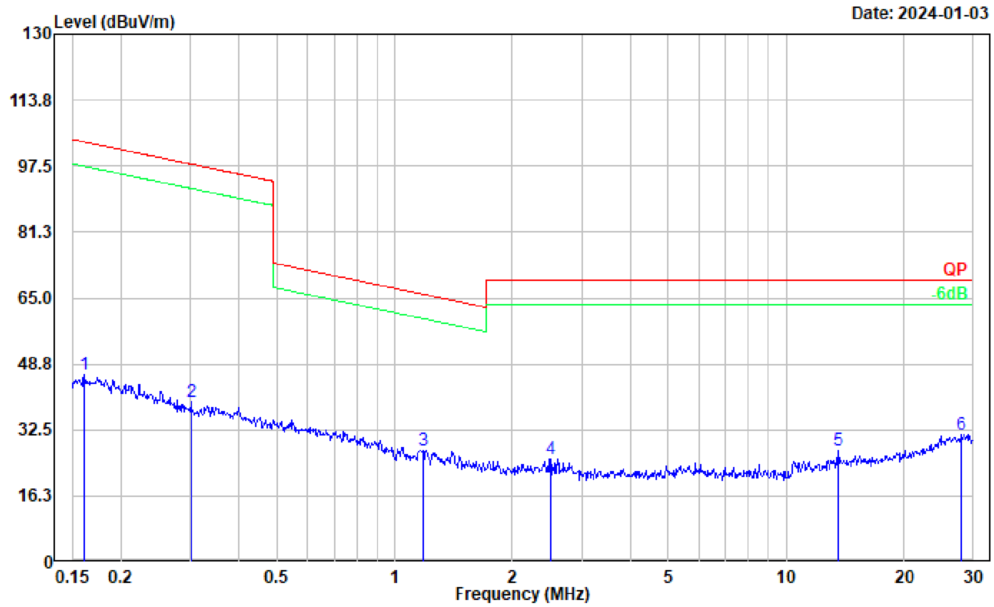
1) 9kHz-1GHz:

Project No.: CR231171703-RF
Tester: Vic Du
Condition: RBW:0.3 kHz VBW:1 kHz SWT:0.1 sec
Polarization: Parallel
Note: Transmitting



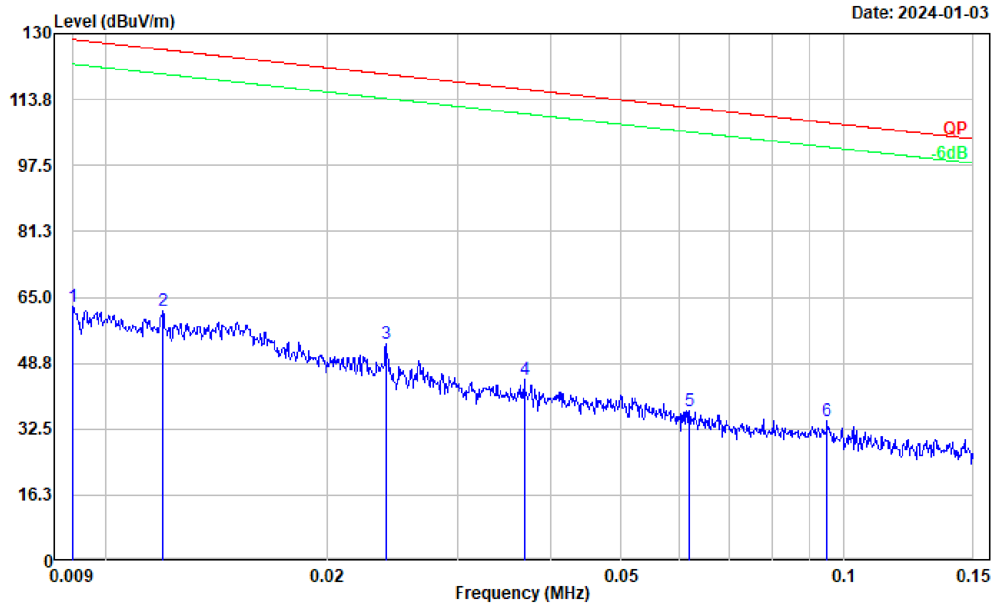
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
1	0.010	27.77	34.91	62.68	127.93	65.25	Peak
2	0.012	27.24	33.39	60.63	125.93	65.30	Peak
3	0.014	28.76	32.35	61.11	124.54	63.43	Peak
4	0.029	24.75	25.31	50.06	118.48	68.42	Peak
5	0.055	19.48	19.71	39.19	112.76	73.57	Peak
6	0.133	18.97	13.09	32.06	105.11	73.05	Peak

Project No.: CR231171703-RF
Tester: Vic Du
Condition: RBW:10 kHz VBW:30 kHz SWT:0.1 sec
Polarization: Parallel
Note: Transmitting



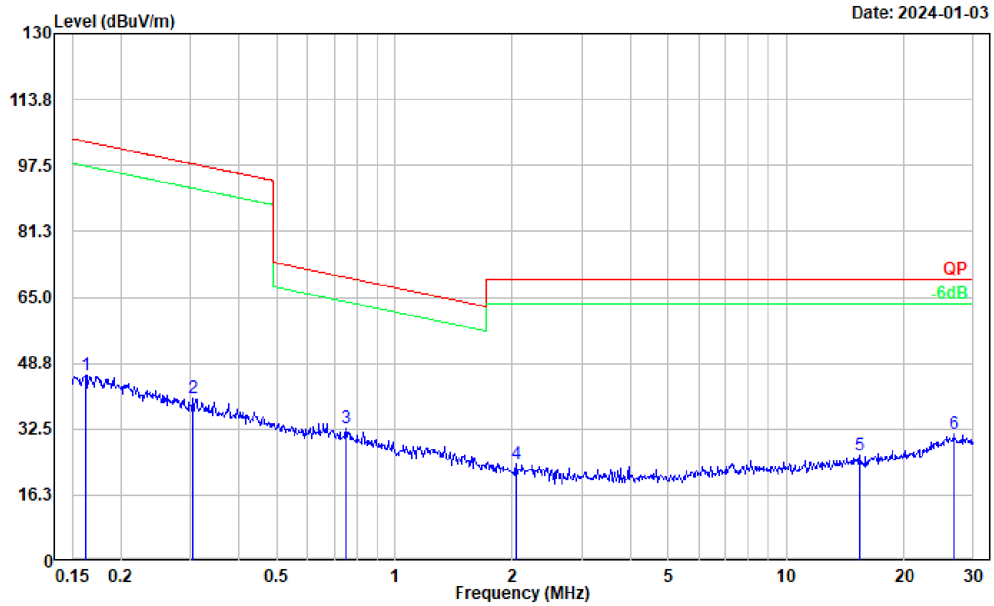
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
1	0.161	34.20	11.82	46.02	103.48	57.46	Peak
2	0.302	34.09	5.31	39.40	98.01	58.61	Peak
3	1.178	32.22	-4.84	27.38	66.02	38.64	Peak
4	2.500	33.46	-8.04	25.42	69.54	44.12	Peak
5	13.551	35.08	-7.76	27.32	69.54	42.22	Peak
6	27.855	38.82	-7.45	31.37	69.54	38.17	Peak

Project No.: CR231171703-RF
Tester: Vic Du
Condition: RBW:0.3 kHz VBW:1 kHz SWT:0.1 sec
Polarization: Perpendicular
Note: Transmitting



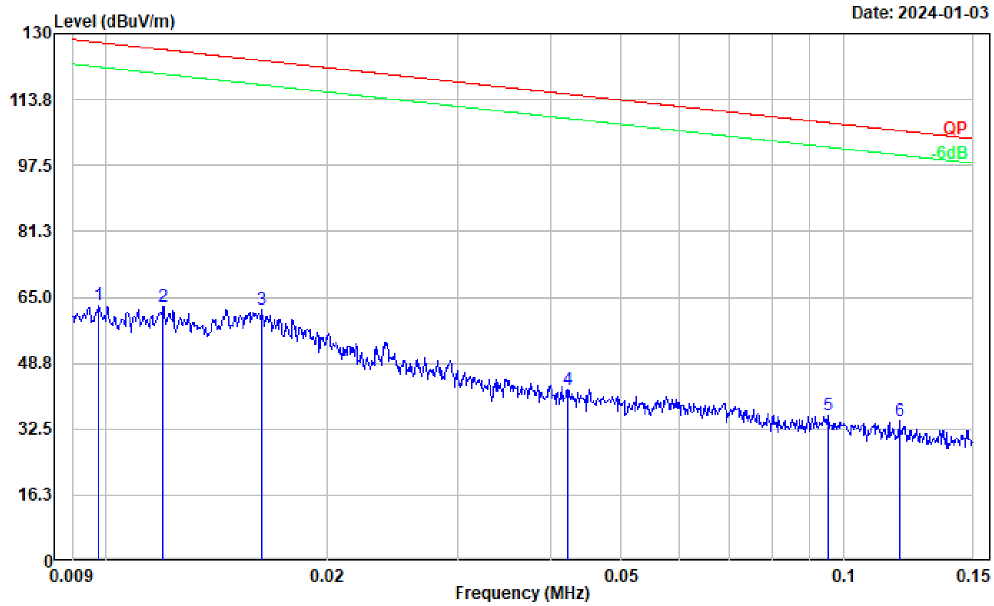
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
1	0.009	26.84	35.70	62.54	128.50	65.96	Peak
2	0.012	28.08	33.47	61.55	126.05	64.50	Peak
3	0.024	25.80	27.59	53.39	120.02	66.63	Peak
4	0.037	21.56	23.17	44.73	116.25	71.52	Peak
5	0.062	18.19	18.81	37.00	111.78	74.78	Peak
6	0.095	19.31	15.06	34.37	108.04	73.67	Peak

Project No.: CR231171703-RF
Tester: Vic Du
Condition: RBW:10 kHz VBW:30 kHz SWT:0.1 sec
Polarization: Perpendicular
Note: Transmitting



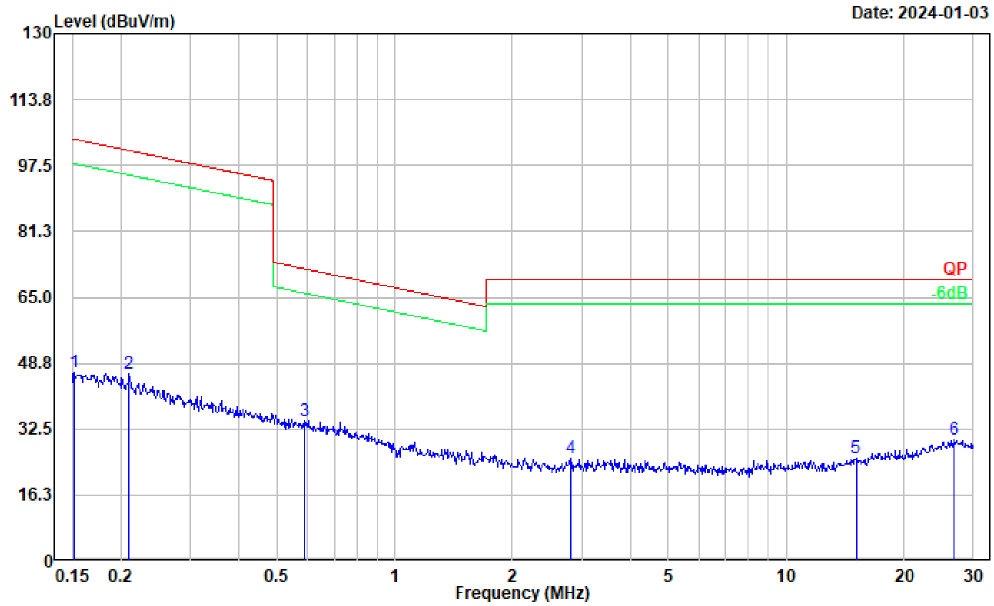
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
1	0.162	34.03	11.74	45.77	103.39	57.62	Peak
2	0.305	34.88	5.24	40.12	97.92	57.80	Peak
3	0.751	34.70	-1.95	32.75	70.01	37.26	Peak
4	2.044	31.78	-7.79	23.99	69.54	45.55	Peak
5	15.388	33.57	-7.61	25.96	69.54	43.58	Peak
6	26.699	38.84	-7.52	31.32	69.54	38.22	Peak

Project No.: CR231171703-RF
Tester: Vic Du
Condition: RBW:0.3 kHz VBW:1 kHz SWT:0.1 sec
Polarization: Ground-parallel
Note: Transmitting



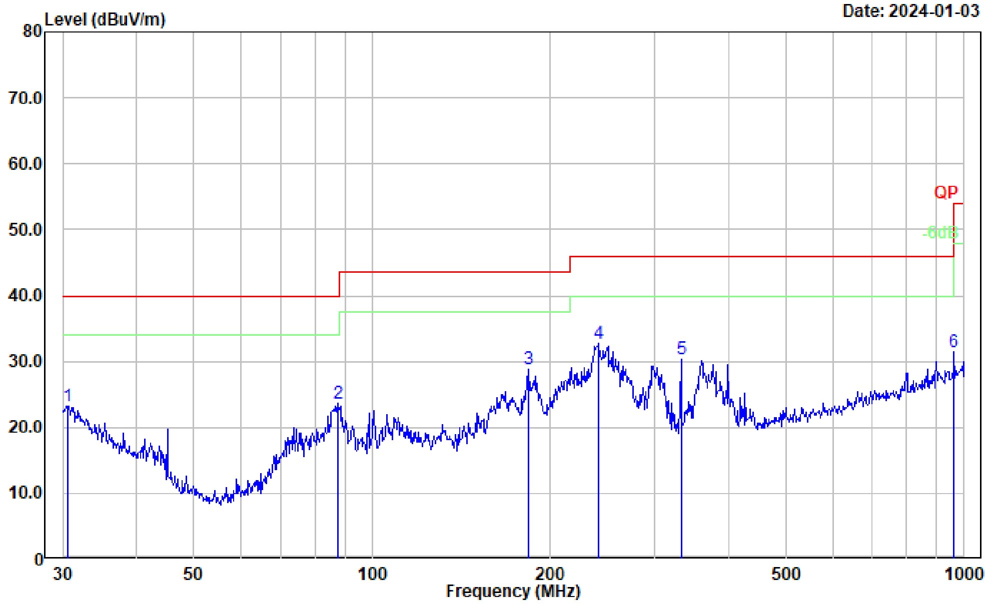
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
1	0.010	28.20	34.70	62.90	127.79	64.89	Peak
2	0.012	29.34	33.47	62.81	126.05	63.24	Peak
3	0.016	30.66	31.37	62.03	123.39	61.36	Peak
4	0.042	20.24	22.05	42.29	115.08	72.79	Peak
5	0.095	20.80	15.03	35.83	108.02	72.19	Peak
6	0.119	20.92	13.75	34.67	106.09	71.42	Peak

Project No.: CR231171703-RF
Tester: Vic Du
Condition: RBW:10 kHz VBW:30 kHz SWT:0.1 sec
Polarization: Ground-parallel
Note: Transmitting



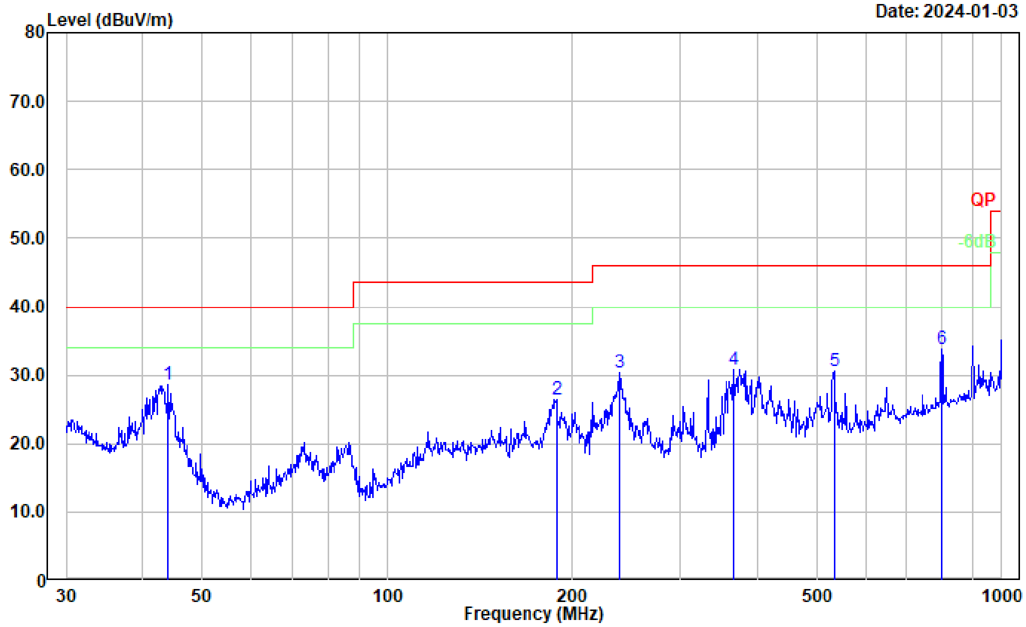
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
1	0.152	34.39	12.24	46.63	103.99	57.36	Peak
2	0.209	36.55	9.55	46.10	101.18	55.08	Peak
3	0.589	34.74	-0.06	34.68	72.18	37.50	Peak
4	2.809	33.53	-8.21	25.32	69.54	44.22	Peak
5	15.066	33.15	-7.64	25.51	69.54	44.03	Peak
6	26.699	37.41	-7.52	29.89	69.54	39.65	Peak

Project No.: CR231171703-RF
Tester: Vic Du
Polarization: horizontal
Note: Transmitting



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.638	27.52	-4.24	23.28	40.00	16.72	Peak
2	87.418	40.75	-17.20	23.55	40.00	16.45	Peak
3	183.201	42.57	-13.70	28.87	43.50	14.63	Peak
4	241.676	45.67	-12.83	32.84	46.00	13.16	Peak
5	332.519	40.17	-9.77	30.40	46.00	15.60	Peak
6	962.162	30.35	1.09	31.44	54.00	22.56	Peak

Project No.: CR231171703-RF
Tester: Vic Du
Polarization: vertical
Note: Transmitting



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	43.966	42.78	-14.08	28.70	40.00	11.30	Peak
2	188.413	40.29	-13.77	26.52	43.50	16.98	Peak
3	238.310	43.25	-12.88	30.37	46.00	15.63	Peak
4	365.539	40.11	-9.22	30.89	46.00	15.11	Peak
5	533.832	35.89	-5.35	30.54	46.00	15.46	Peak
6	798.980	35.09	-1.32	33.77	46.00	12.23	Peak

4.2.2 Above 1 GHz

Serial Number:	2EK8-1	Test Date:	1-40GHz: 2025/4/9 Above 40GHz: 2024/1/11~
Test Site:	966-1	Test Mode:	Transmitting
Tester:	Coo Tian, Mack Huang	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.1~26.3	Relative Humidity: (%)	57~69	ATM Pressure: (kPa)	101.4

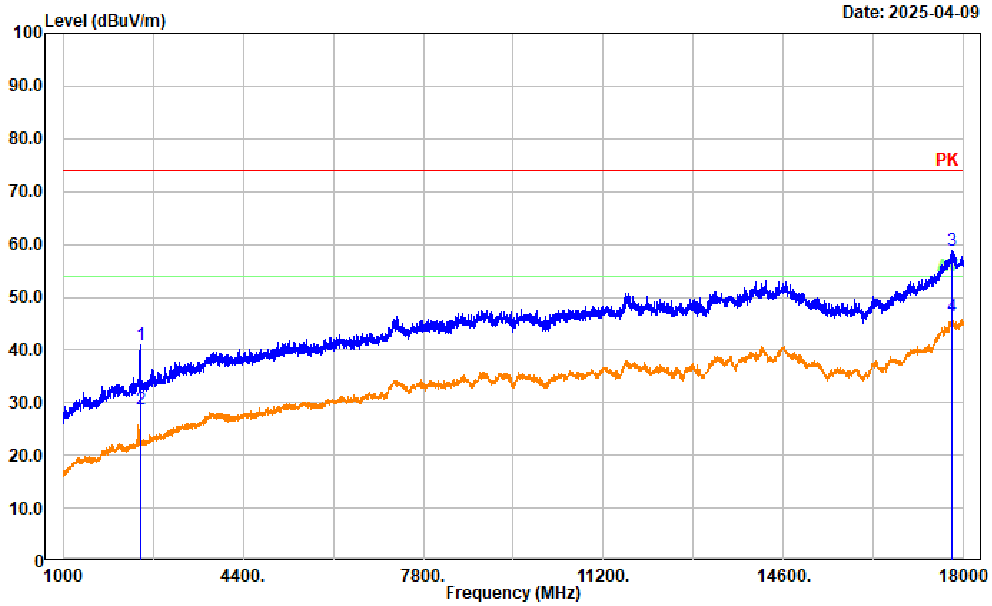
Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
ETS-Lindgren	Horn Antenna	3115	9912-5985	2023/12/6	2026/12/5
R&S	Spectrum Analyzer	FSV40	101591	2025/3/31	2026/3/30
MICRO-COAX	Coaxial Cable	UFA210A-1-1200-70U300	217423-008	2025/1/10	2026/1/9
MICRO-COAX	Coaxial Cable	UFA210A-1-2362-300300	235780-001	2025/1/10	2026/1/9
A.H	Preamplifier	PAM-0118P	628	2025/2/21	2026/2/20
Audix	Test Software	E3	191218 (V9)	N/A	N/A
PASTERNACK	Horn Antenna	PE9852/2F-20	112002	2024/2/4	2027/2/3
Quinstar	Preamplifier	QLW-18405536-JO	15964001005	2025/1/6	2026/1/5
MICRO-COAX	Coaxial Cable	UFB142A-1-2362-200200	235772-001	2025/1/6	2026/1/5
PASTERNACK	Horn Antenna	PE9850/2F-20	072001	2024/2/4	2027/2/3
R&S	Spectrum Analyzer	FSV40	101591	2023/3/31	2024/3/30
OML	Harmonic Mixer	WR19/M19HWD	U60314-1	2023/2/16	2026/2/15
OML	Horn Antenna	M19RH	11648-03	2023/2/27	2026/2/26
OML	Harmonic Mixer	WR12/M12HWD	E60119-1	2023/2/16	2026/2/15
OML	Horn Antenna	M12RH	E60119-2	2023/2/27	2026/2/26
OML	Harmonic Mixer	WR08/M08HWD	F60315-1	2023/2/16	2026/2/15
OML	Horn Antenna	M08RH	F60315-2	2023/2/27	2026/2/26
OML	Harmonic Mixer	WR05/M05HWD	G60107-1	2023/2/16	2026/2/15
OML	Horn Antenna	M05RH	G60107-2	2023/2/27	2026/2/26

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

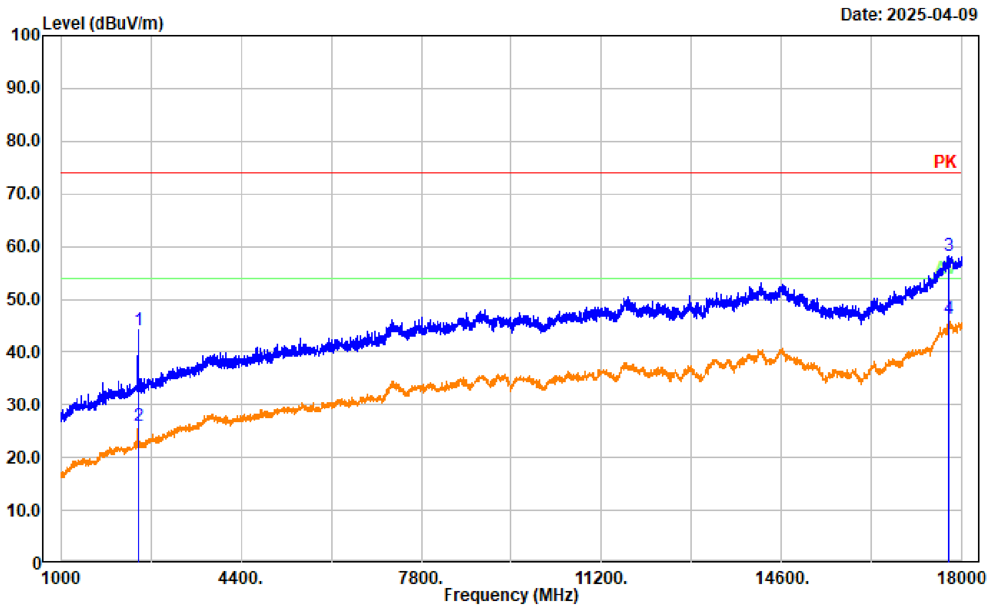
1GHz-40GHz:

Project No.: CR231171703-RF
Tester: Mack Huang
Condition: PK trace RBW:1MHz; VBW:3MHz; SWT:0.3sec AV trace RBW:1MHz; VBW:5kHz; SWT:auto
Polarization: horizontal
Note:



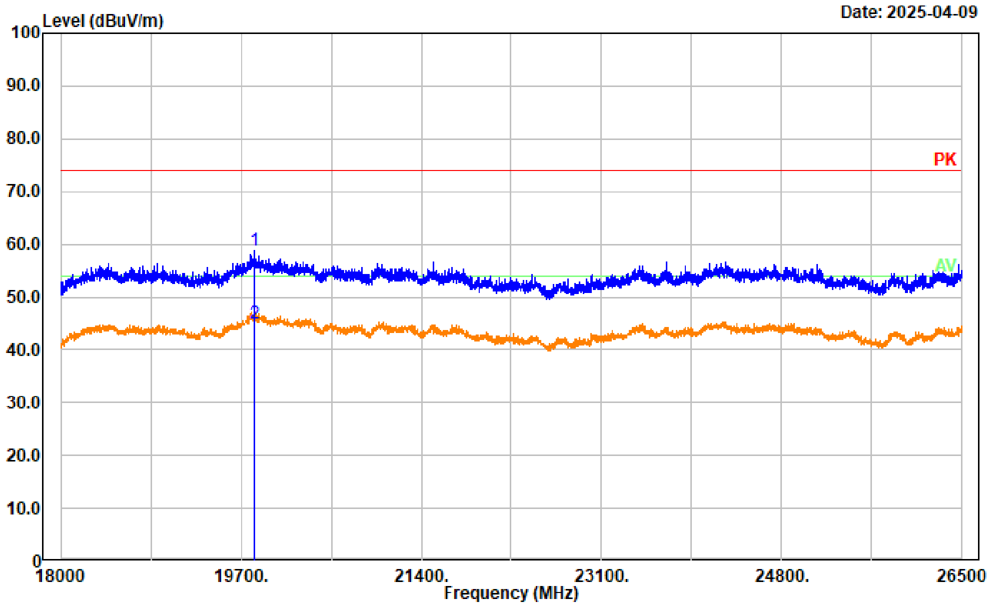
No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
1	2458.600	51.33	-10.49	40.84	74.00	33.16	Peak
2	2458.600	39.19	-10.49	28.70	54.00	25.30	Average
3	17782.400	45.21	13.47	58.68	74.00	15.32	Peak
4	17782.400	32.78	13.47	46.25	54.00	7.75	Average

Project No.: CR231171703-RF
Tester: Mack Huang
Condition: PK trace RBW:1MHz; VBW:3MHz; SWT:0.3sec AV trace RBW:1MHz; VBW:5kHz; SWT:auto
Polarization: vertical
Note:



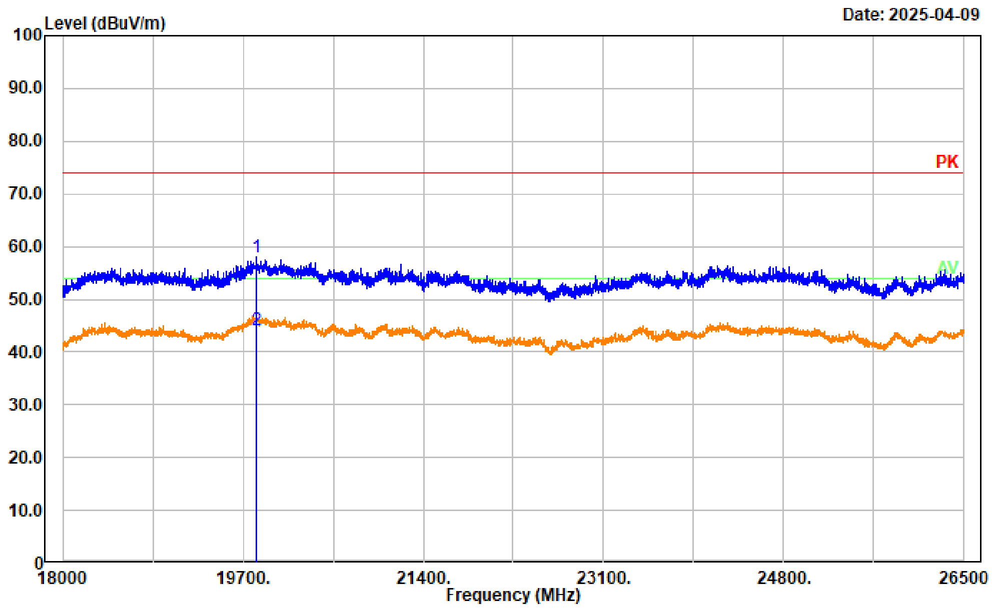
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
1	2458.600	54.62	-10.49	44.13	74.00	29.87	Peak
2	2458.600	36.49	-10.49	26.00	54.00	28.00	Average
3	17748.400	44.91	13.31	58.22	74.00	15.78	Peak
4	17748.400	33.05	13.31	46.36	54.00	7.64	Average

Project No.: CR231171703-RF
Tester: Mack Huang
Condition: PK trace RBW:1MHz; VBW:3MHz; SWT:0.3sec AV trace RBW:1MHz; VBW:5kHz; SWT:auto
Polarization: Horizontal
Note:



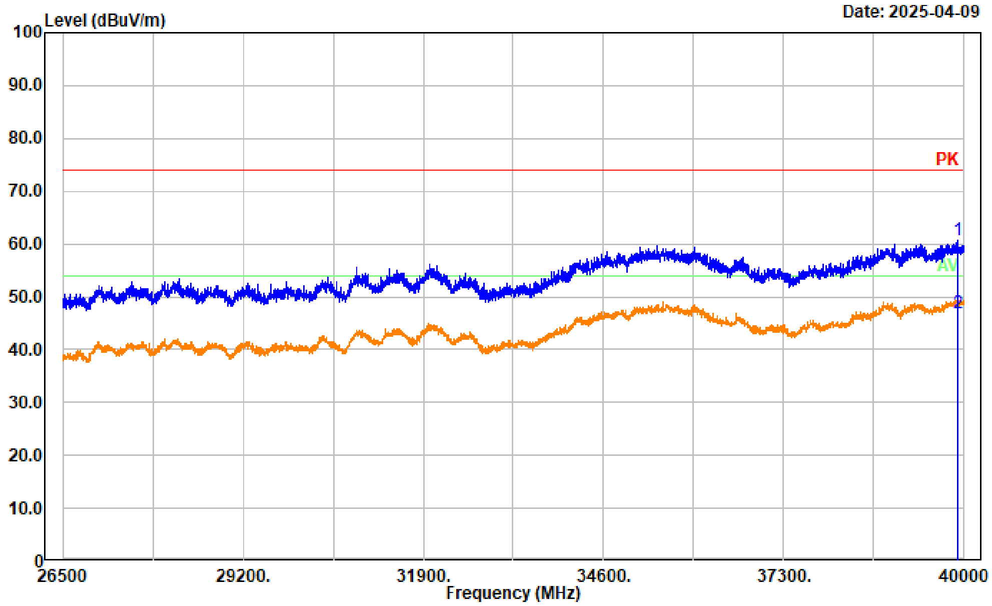
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
1	19824.100	50.81	7.95	58.76	74.00	15.24	Peak
2	19824.100	36.94	7.95	44.89	54.00	9.11	Average

Project No.: CR231171703-RF
Tester: Mack Huang
Condition: PK trace RBW:1MHz; VBW:3MHz; SWT:0.3sec AV trace RBW:1MHz; VBW:5kHz; SWT:auto
Polarization: Vertical
Note:



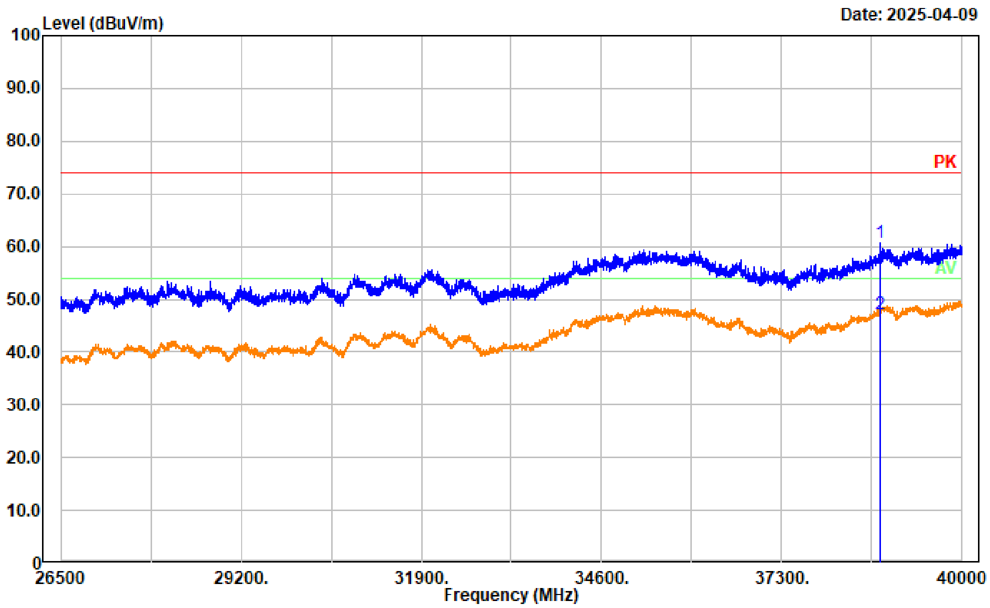
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
1	19822.400	49.96	7.95	57.91	74.00	16.09	Peak
2	19822.400	36.15	7.95	44.10	54.00	9.90	Average

Project No.: CR231171703-RF
Tester: Mack Huang
Condition: PK trace RBW:1MHz; VBW:3MHz; SWT:0.3sec AV trace RBW:1MHz; VBW:5kHz; SWT:auto
Polarization: Horizontal
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
1	39916.300	53.65	7.16	60.81	74.00	13.19	Peak
2	39916.300	39.85	7.16	47.01	54.00	6.99	Average

Project No.: CR231171703-RF
Tester: Mack Huang
Condition: PK trace RBW:1MHz; VBW:3MHz; SWT:0.3sec AV trace RBW:1MHz; VBW:5kHz; SWT:auto
Polarization: Vertical
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
1	38779.600	52.16	8.58	60.74	74.00	13.26	Peak
2	38779.600	38.45	8.58	47.03	54.00	6.97	Average

40-200GHz:

Frequency (GHz)	Receiver		Polar (H/V)	Factor (dB/m)	Field Strength (dBμV/m)	Power Density (pW/cm^2)	Limit (pW/cm^2)
	Reading (dBμV)	Detector					
		Test Frequency:		62	GHz		
42.350	55.43	PK	H	39.16	85.05	84.85	90.00
42.322	55.48	PK	V	39.15	85.09	85.64	90.00
67.025	50.23	PK	H	43.01	83.70	62.18	90.00
67.020	51.04	PK	V	43.01	84.51	74.93	90.00
92.175	51.36	PK	H	45.37	81.17	34.73	90.00
92.250	51.48	PK	V	45.38	81.30	35.78	90.00
145.725	50.34	PK	H	49.14	83.92	65.41	90.00
145.730	50.76	PK	V	49.14	84.34	72.05	90.00

Note:
Factor = Antenna Factor
Field Strength = Reading + Factor + 20log($d_{Meas}/d_{SpecLimit}$)
d_{Meas} is the measurement distance, in m
$d_{SpecLimit}$ is the distance specified by the limit, in m

$$PD = \frac{E_{SpecLimit}^2}{377}$$

where

PD is the power density at the distance specified by the limit, in W/m^2
$E_{SpecLimit}$ is the field strength at the distance specified by the limit, in V/m

The Specified distance is 3m.

4.3 20 dB Emission Bandwidth & 99% Occupied Bandwidth:

Serial Number:	2EK8-1	Test Date:	2024/2/1
Test Site:	966-1	Test Mode:	Transmitting
Tester:	Coco Tian	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.8	Relative Humidity: (%)	55	ATM Pressure: (kPa)	101.2

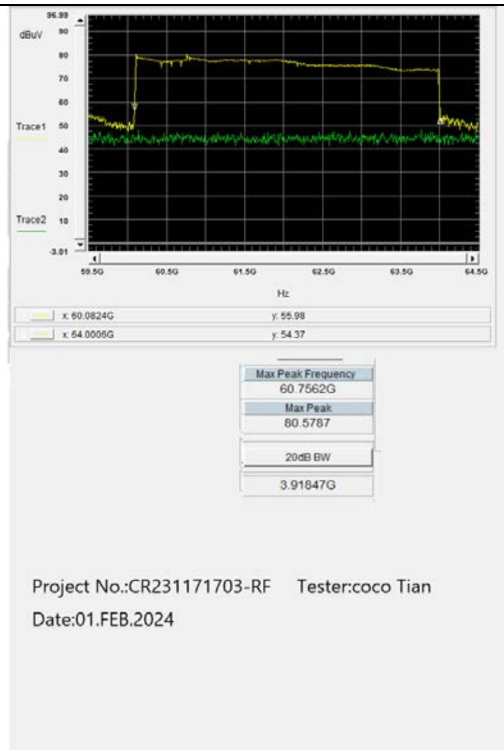
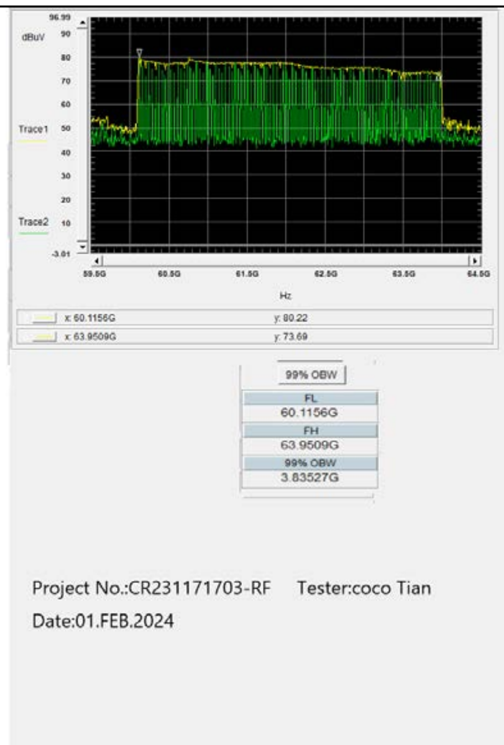
Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Spectrum Analyzer	E4440A	MY44303354	2023/3/31	2024/3/30
Agilent	Harmonic Mixer	Agilent 11970V	2521A01768	2023/2/16	2026/2/15
Flann Micowave	Horn Antenna	861V/385	738	2023/2/27	2026/2/26
BACL	Test Software	E4440A	V1.1	N/A	N/A

***Statement of Traceability:** China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Test Mode	20dB Emission Bandwidth (GHz)	99% Occupied Bandwidth (GHz)	F_L (GHz)	Limit F_L (GHz)	F_H (GHz)	Limit F_H (GHz)
Sweep	3.918	3.835	60.1156	60	63.9509	64

20 dB Emission Bandwidth

99% Occupied Bandwidth


4.4 Equivalent Isotropically Radiated Power (EIRP):

Serial Number:	2EK8-1	Test Date:	2025/4/9
Test Site:	966-1	Test Mode:	Transmitting
Tester:	Mack Huang	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	25.1	Relative Humidity: (%)	69	ATM Pressure: (kPa)	101.4

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Flann Micowave	Horn Antenna	861V/385	738	2023/2/27	2026/2/26
Agilent	Harmonic Mixer	Agilent 11970V	2521A01768	2023/2/16	2026/2/15
Agilent	Spectrum Analyzer	E4440A	MY44303354	2023/3/31	2024/3/30

**** Statement of Traceability:** China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Chirps Correction Factor

Chirps Time▲ (µs)	BW_{chirp} (MHz)	RBW (MHz)	Chirps Correction Factor (dB)
64	3835	1	14.23

Note:
Refer to ANSI C63.10-2020/cor 1-2023Annex L.1. The chirps correction factor was calculated using the formula:

$$\alpha = \frac{1}{\left(1+\left[\left(\frac{2\times\ln(2)}{\pi}\right)^{2}\times\left(\frac{BW_{\text{Chirp}}}{T_{\text{Chirp}}\times RBW^{2}}\right)^{2}\right]\right)^{0.25}}$$

where

α	is the reduction in amplitude
BW_{Chirp}	is the FMCW Chirp Bandwidth
T_{Chirp}	is the FMCW Chirp Time

EIRP:

Reading (dBµV)	Detector	Polar (H/V)	Chirps Correction Factor (dB)	Antenna Factor (dB/m)	Field Strength (dBµV/m)	EIRP (dBm)	Limit (dBm)
68.14	PK	V	14.23	42.02	124.39	19.59	20

The Mixers and it`s RF cables is compose a system for calibration and already added into the reading.
Field Strength (dBµV/m) = Reading + Chirps Correction Factor + Antenna Factor
EIRP = Field Strength (dBµV/m) + 20log(Measurement distance) - 104.8
Measurement distance = 1m
The test data recorded was the maximum polarization.

4.5 Frequency Stability:

Serial Number:	2EK8-1	Test Date:	2024/1/11
Test Site:	RF	Test Mode:	Transmitting
Tester:	Coco Tian	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	26.3	Relative Humidity: (%)	57	ATM Pressure: (kPa)	101.4

Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	Spectrum Analyzer	E4440A	MY44303354	2023/3/31	2024/3/30
Agilent	Harmonic Mixer	Agilent 11970V	2521A01768	2023/2/16	2026/2/15
Flann Micowave	Horn Antenna	861V/385	738	2023/2/27	2026/2/26
BACL	TEMP&HUMI Test Chamber	BTH-150-40	30174	2023/3/31	2024/3/30
UNI-T	Multimeter	UT39A+	C210582554	2023/9/28	2024/9/27
ZHAOXIN	DC Power Supply	RXN-6010D	21R6010D0912386	N/A	N/A
BACL	Test Software	E4440A	V1.1	N/A	N/A

** **Statement of Traceability:** China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Temperature	Voltage	Frequency (GHz)			
℃	V_{DC}	f_L	f_H	f_L Limit	f_H Limit
-20	5	60.1130	63.9501	60	64
-10	5	60.1145	63.9519	60	64
0	5	60.1135	63.9517	60	64
10	5	60.1145	63.9510	60	64
20	5	60.1158	63.9513	60	64
30	5	60.1145	63.9510	60	64
40	5	60.1134	63.9519	60	64
50	5	60.1149	63.9515	60	64
20	4.75	60.1139	63.9510	60	64
20	5.25	60.1137	63.9513	60	64

4.6 Duty Cycle:

Serial Number:	2EK8-1	Test Date:	2024/2/2
Test Site:	966-1	Test Mode:	Transmitting
Tester:	Coco Tian	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	26.0	Relative Humidity: (%)	52	ATM Pressure: (kPa)	101.1

Test Equipment List and Details:

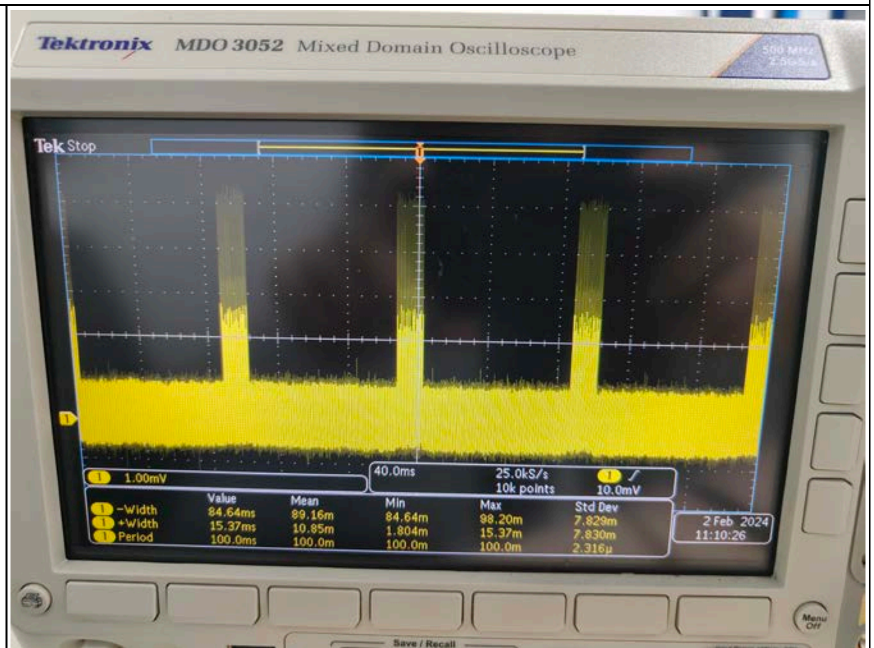
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Flann Micowave	Horn Antenna	861V/385	738	2023/2/27	2026/2/26
millitech	RF Detector	DET-15-RPFW0	A18521	2023/2/22	2026/2/21
Tektronix	Mixed Domain Oscilloscope	MDO 3052	C041775	2023/11/15	2024/11/14

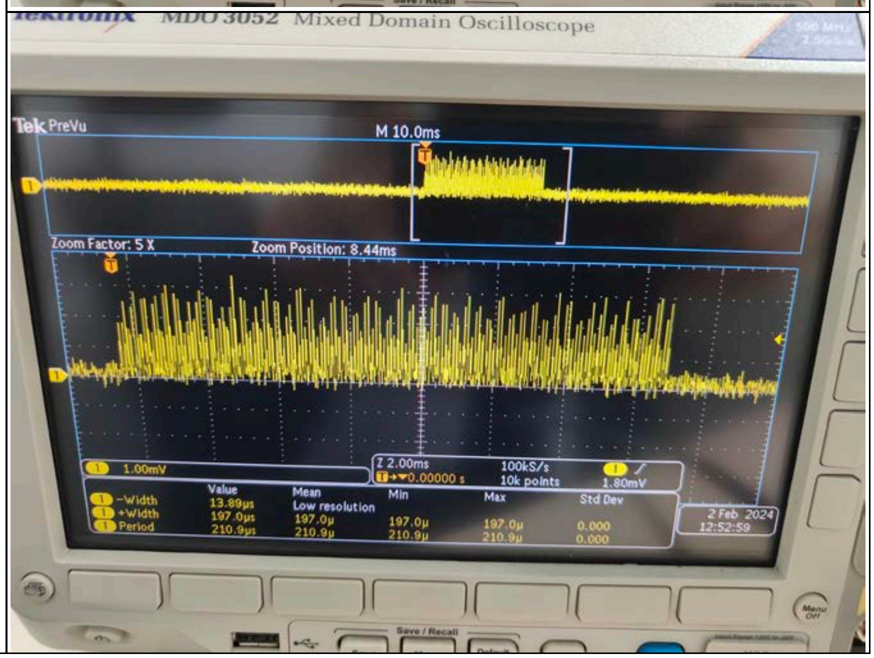
**** Statement of Traceability:*** *China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

Ton+off (ms)	Ton (ms)	Toff (ms)	Sum of Continuous Transmitter Off-times (ms)	Limit (ms)
100	15.37	84.64	17.63	≥16.5
Note: Sum of Continuous Transmitter Off-times= Observation Time（33ms）- Ton				

Duty Cycle


Tektronix MDO 3052 Mixed Domain Oscilloscope
Tek Stop
1.00mV
40.0ms
25.0kS/s
10k points
10.0mV
Value Mean Min Max Std Dev
-Width 84.64ms 89.16m 84.64m 98.20m 7.829m
+Width 15.37ms 10.85m 1.804m 15.37m 7.830m
Period 100.0ms 100.0m 100.0m 100.0m 2.316µ
2 Feb 2024
11:10:26


MDO 3052 Mixed Domain Oscilloscope
Tek PreVu
M 10.0ms
Zoom Factor: 5 X
Zoom Position: 8.44ms
1.00mV
Z 2.00ms
100kS/s
10k points
1.80mV
Value Mean Min Max Std Dev
Low resolution
-Width 13.89µs
+Width 197.0µs 197.0µ 197.0µ 197.0µ 0.000
Period 210.9µs 210.9µ 210.9µ 210.9µ 0.000
2 Feb 2024
12:52:59

5. RF EXPOSURE EVALUATION

5.1 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

5.1.1 Applicable Standard

FCC §15.255(g) & §1.1310 & §2.1091

Regardless of the power density levels permitted under this subpart, devices operating under the provisions of this subpart are subject to the radiofrequency radiation exposure requirements specified in §§ 1.1307(b), 2.1091, and 2.1093 of this chapter, as appropriate. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See §1.1307(b)(1) of this chapter.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f^2)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

5.1.2 Procedure

Prediction of power density at the distance of the applicable MPE limit
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

5.2 Measurement Result

Frequency (GHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
	(dBi)	(numeric)	(dBm)	(mW)			
60-64	0	1	20	100.00	20	0.0199	1

Note:
The Value of Maximum Conducted Power including Tune-up Tolerance was declared by the customer.

Result: The device meet FCC MPE at 20 cm distance.

6. EUT PHOTOGRAPHS

Please refer to the attachment CR231171703-EXP EUT EXTERNAL PHOTOGRAPHS and CR231171703-INP EUT INTERNAL PHOTOGRAPHS

7. TEST SETUP PHOTOGRAPHS

Please refer to the attachment CR231171703-00-TSP TEST SETUP PHOTOGRAPHS.

===== END OF REPORT =====